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Notes on Mosquitoes in Nebraska (Diptera: Culicidae).¹

By H. DOUGLAS TATE and WILLIS W. WIRTH²
Department of Entomology, College of Agriculture,
University of Nebraska.

This paper presents a list of the species of mosquitoes (Culicidae, subfamily Culicinae) represented in the collection of the Department of Entomology, University of Nebraska, and the localities in the state from which the specimens have been collected. The few isolated records previously published also are included. Although mosquitoes have long been a disturbing factor in some parts of the state, they have received relatively little attention. Indications are that in recent years the annoyance caused by them has increased, probably due largely to more extensive irrigation which has introduced favorable breeding conditions. In addition to the nuisance factor these pests frequently have been an economic influence of considerable importance in agricultural development. Of particular interest is their relationship to encephalomyelitis, a disease which in recent years has attained epidemic proportions in this area. These preliminary notes, involving 21 species, are presented at this time largely because of the scarcity of published records on these insects in Nebraska.

Dyar (1922) reports *Aedes dorsalis* Mg. and *Psorophora ciliata* Fab. from Nebraska. A recent publication by King and Bradley (1941) lists *Anopheles occidentalis* Dyar & Knab and *An. punctipennis* Say from this state. In a personal communi-

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cation received by the authors in September, 1941, Dr. Alan C. Stone stated that he had identified four species of mosquitoes from Nebraska, namely *Aedes trivittatus* (Say), *Aedes vexans* (Mg.), *Anopheles quadrimaculatus* Say, and *Culex tarsalis* Coq. These specimens were submitted to him from camps of the Civilian Conservation Corps and exact locality records were not obtained. The writers were unable to secure any other references to mosquitoes collected in this state. Therefore, nearly all of the 21 species reported below presumably are new records for this area.

AEDES DORSALIS Meigen.* Glen (Sioux Co.), Aug. 14, 1906 (P. R. Jones) (♀); Lincoln, April 27, 1915 (L. M. Gates) (♀), July 9, 17, 21, 1929 (R. H. Nelson) (3 ♀ ♀), June (H. S. Smith) (♀), Aug. (♂). Also reported from Nebraska by Dyar (1922).

Ae. EXCRUCIANS Walker. (See *Aedes stimulans*).

Ae. FITCHII Felt & Young. (See *Aedes stimulans*).

Ae. IDAHOENSIS (Theobald)* One specimen from Glen (Sioux Co.), Aug., 1906 (P. R. Jones) (♀).

Ae. NIGROMACULUS Ludlow.* Clay Center, July 24, 1921 (R. E. Weir) (♂); Dunbar, Sept. 24, 1941 (W. W. Wirth) (40 ♀ ♀, 1 ♂); Lincoln, June 16, 1908 (J. T. Zimmer) (♂), July 15, 1909 (F. A. Burnham (♀), July 9, 17, 21, 1929 (R. H. Nelson) (4 ♀ ♀), Sept. 12, 1934 (R. E. Hill) (♀), Sept. 17, 1935 (W. W. Darlington) (♀). This species formed up to 25 per cent of light-trap collections at Dunbar in September, 1941, about 10 days following heavy rains which flooded a nearby creek valley.

Ae. STIMULANS Walker. Females of *Aedes excrucians*, *fitchii*, and *stimulans*, the more common members of the *stimulans* group, are difficult to separate. Matheson (1928) separates them on the basis of the lower mesepimeral bristles, and on this basis these three species could be identified from the material in the collection. However, since there were neither male nor larval specimens, and in the absence of more inclusive characters the records of these species have been grouped together under *Aedes (stimulans group)*.* Glen (Sioux Co.), Aug. 16, 1905

(♀), Aug., 1906 (P. R. Jones) (27 ♀ ♀), July 14, 1910 (L. Bruner) (♀); Pine Ridge (Dawes Co.), July 7, 1910 (L. Bruner) (♀).

Ae. TRISERIATUS Say.* This species, typically a tree-hole breeder, is represented in the collection by specimens as follows: Glen (Sioux Co.), Aug. 11, 1906 (P. R. Jones) (3 ♀ ♀); Monroe Canyon (Sioux Co.), Aug. 29, 1921 (R. E. Weir) (♀).

Ae. TRIVITTATUS Coquillett.* Dunbar, Sept. 24, 1941 (W. W. Wirth) (10 ♀ ♀, 1 ♂); Glen (Sioux Co.), Aug., 1906 (P. R. Jones) (2 ♀ ♀); Monroe Canyon (Sioux Co.), Aug. 5, 1908 (R. W. Dawson) (4 ♀ ♀); Lincoln, July 15, 1929 (R. H. Nelson) (♂). The females from Dunbar were collected in the early afternoon on a cloudy day near weeds beside a flood pool, at which time they were present in large numbers and biting fiercely.

Ae. VEXANS Meigen.* Child's Point May 20, 1905 (♀); Dunbar, Sept. 24, 1941 (W. W. Wirth) (25 ♀ ♀, 6 ♂ ♂); Dundy Co., June 26, 1905 (M. H. Swenk) (♂); Glen (Sioux Co.), Aug. 12, 1906 (P. R. Jones) (♀), July 14, 1910 (L. Bruner) (♀); Jamaica, July 12, 1929 (R. H. Nelson) (♂); Lincoln, May 20, 1904 (♀), Aug. 12, 1905 (♂), Sept. 28, 1905 (♀), July 20, 1910 (F. A. Burnham) (♀), July 9, 11, 12, 15, 17, 1929 (R. H. Nelson) (3 ♀ ♀, 8 ♂ ♂); Waverly, Feb. 10 (L. Bruner) (♀); West Point, June, 1910 (♀).

ANOPHELES OCCIDENTALIS Dyar & Knab.* Glen (Sioux Co.), Aug. 16, 1905 (10 ♀ ♀), Aug., 1906 (P. R. Jones) (45 ♀ ♀). Also reported by King and Bradley (1941) from Glen (Sioux Co.), Nebraska. Nebraska and Iowa apparently are the most southern limits of its known range.

A. PUNCTIPENNIS Say.* Dunbar, Sept. 24, 1941 (W. W. Wirth) (3 ♀ ♀) light trap; Lincoln, Nov. 5, 1903 (2 ♀ ♀) on window; Waverly, Feb. 10 (L. Bruner) (4 ♀ ♀, 3 ♂ ♂). Also reported by King and Bradley (1941) from Salt Creek, near Waverly, Nebraska, 1904. During September, 1941, first to third stage larvae were found breeding abundantly in shallow grassy lowland pools formed by the overflow from a creek at Dunbar, Nebraska, in association with *Culex tarsalis* larvae and

pupae. The November record is interesting in that it shows that Anophelines may be active, at least in houses, well into the winter as far north as Nebraska.

A. QUADRIMACULATUS Say.* One specimen in the Nebraska collection appears to be this species: Lincoln, Sept., 1940 (M. H. Swenk) (♀) in garage. Nebraska is the limit of the known range of *An. quadrimaculatus* north of Kansas and west of Iowa.

CULEX PIPIENS Linnaeus.* Dunbar, Sept. 21, 1941 (W. W. Wirth) larval collections, from a cistern, and 1 adult (♂), Sept. 24, 1941 (W. W. Wirth) (20 ♀♀ and 2 ♂♂ in collection, found resting in a cesspool); Lincoln, Sept. 28, 1915 (♂), Oct. (♂).

C. QUINQUEFASCIATUS Say.* One male, Lincoln, Nebr., October. (Additional data not available.)

C. RESTUANS Theobald.* Only one specimen; Waverly, Feb. 10 (L. Bruner) (♂).

C. TARSALIS Coquillett.* Dunbar, Sept. 21, 1941 (W. W. Wirth) (35 ♀♀, 3 ♂♂); Dundy Co., June 25, 26, 1905 (M. H. Swenk) (♀, ♂); Glen (Sioux Co.), Aug., 1906 (P. R. Jones) (♀); Lincoln, June 25, 27, 1910 (11 ♀♀, 4 ♂♂), Feb. 11, 1911 (L. Bruner) (6 ♀♀) in cellar, July 11, 1929 (R. H. Nelson) (♂), Sept. 12, 1934 (R. E. Hill) (♀), Aug. 13, 1936 (W. W. Darlington) (♀); Waverly, Feb. 10 (L. Bruner) (12 ♀♀, 4 ♂♂). *Culex tarsalis* larvae were found developing very abundantly at Dunbar in September, 1941, in ditches and grassy lowlands flooded by a swollen creek. At the same time light-trap collections in this locality yielded up to 50 per cent of this species.

PSOROPHORA CILIATA Fabricius.* Dunbar, Sept. 24, 1941 (W. W. Wirth) (♀); Lincoln, June 18, 1908 (C. N. Gable) (♀), June 15, 1924 (♀, ♂). Also reported by Dyar (1922) from Lincoln.

P. COLUMBIAE Dyar and Knab. One specimen taken in a light trap at Dunbar, Sept. 24, 1941 (W. W. Wirth) (♀).

P. SIGNIPENNIS Coquillett.* Dunbar, Sept. 20, 21, 24, 1941 (W. W. Wirth) (85 ♀♀, 6 ♂♂); Dundy Co., June 26, 1905

(M. H. Swenk); Lincoln, July 17, 1929 (R. H. Nelson) (♀, ♂).

THEOBALDIA INCIDENS Thomson.* War Bonnet Canyon (Sioux Co.), (♀). Previous records for this species extended as far east as Montana in the North and New Mexico in the South. This apparently is the first time it has been found east of the Rocky Mountains.

T. INORNATA Williston.* Dunbar, Sept. 24, 1941 (W. W. Wirth) (11 ♀ ♀); Lincoln, March 18, 1913 (L. Bruner) (♀), May 26, 1930 (R. Roberts) (2 ♀ ♀); Waverly, Feb. 10 (L. Bruner) (♀).

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Two New Species of *Calophya* and Notes on Others (*Psyllidae: Homoptera*).

By L. D. TUTHILL, Iowa State College, Ames, Iowa.

The genus *Calophya* is holarctic in distribution and so far as is known the members all have species of *Rhus* as their host plants, except *C. oweni* which inhabits *Phoradendron juniperinum*. Intensive collecting in areas of the western United States, the homopterous fauna of which has not been well known previously, has resulted in the capture of the two species here described as new.

CALOPHYA CALIFORNICA Schwarz.

1904 *Calophya californica* Schwarz, Proc. Ent. Soc. Wash. VI: 241, 242.